

1           3. The method of claim 1, further comprising the step of forming a solderable surface  
2 on at least one of said optical subassemblies or said image sensor subassemblies, wherein  
3 said forming step includes the step of overmolding non-solderable material onto solderable  
4 material to form said solderable surface.

1           4. The method of claim 1, further comprising the step of forming a solderable surface  
2 on at least one of said optical or image sensor subassemblies, wherein said forming step  
3 includes the step of plating a solderable material onto a non-solderable material.

cont.  
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1           5. The method of claim 1, further comprising the step of forming a solderable  
2 material on at least one of said optical or image sensor subassemblies, wherein said forming  
3 step includes the step of insert molding solderable material in non-solderable material.

1           6. The method of claim 1, further comprising the step of forming a solderable surface  
2 on said optical subassembly, wherein said forming step includes the step of making a frame  
3 for said optical subassembly comprising essentially solderable material.

1           7. The method of claim 1, further comprising the step of forming a solderable surface  
2 on at least one of said optical subassemblies or said image sensor subassemblies, wherein  
3 said forming step includes the step of making said solderable surface in an irregular  
4 configuration having an increased surface area per unit three dimensional space relative to  
5 that of a smooth surface.

1           8. The method of claim 7, wherein said at least one solderable surface is in the  
2 configuration of a pin.

1           9. The method of claim 7, when said at least one solderable surface is in the  
2 configuration of a threaded screw.

1           10. The method of claim 7, wherein said at least one solderable surface is in the  
2 configuration of a hole.

11. The method of claim 1, further comprising the step of forming a first solderable surface on one of said subassemblies and a second solderable surface in said other of said subassemblies, wherein said first solderable surface is made in the configuration of a pin, and said second solderable surface is made in the configuration of a hole, wherein said pin has a diameter smaller than said hole to allow positional adjusting of said optical subassembly relative to said image sensor subassembly.

12. The method of claim 1, further comprising the steps of forming a solderable pin on one of said subassemblies, and making a hole for receiving said pin on the remaining of said subassemblies.

13. (Amended) A method for mounting an optical subassembly to an image sensor subassembly, said method comprising the steps of:

forming at least one solderable surface on at least one of said optical and image sensor subassemblies;

moving said optical subassembly in proximity with said image sensor subassembly to define an interface delimited by said at least one solderable surface of said optical subassembly or said image sensor subassembly; and

soldering said optical subassembly and said image sensor subassembly together at said interface, wherein said optical subassembly and said image sensor subassembly are configured so that said image sensor subassembly and said optical subassembly are not substantially benched against one another either of an x or y direction prior to said soldering step.

14. The method of claim 13, wherein said forming step includes the step of overmolding non-solderable material onto solderable material.

15. The method of claim 13, wherein said forming step includes the step of plating a solderable material onto non-solderable material.

16. The method of claim 13, wherein said forming step includes the step of insert molding solderable material in non-solderable material.

1 17. The method of claim 13, wherein said forming step includes the step of making a  
2 frame for said optical subassembly comprising essentially solderable material.

1 18. The method of claim 13, wherein said forming step includes the step of making  
2 said solderable surface in an irregular configuration having an increased surface area per unit  
3 three dimensional space relative to that of a smooth surface.

1 19. The method of claim 18, wherein said at least one solderable surface is in the  
2 configuration of a pin.

1 20. The method of claim 18 wherein said at least one solderable surface is provided  
2 by a threaded screw.

1 21. The method of claim 18 wherein said at least one solderable surface is in the  
2 configuration of a hole.

22. The method of claim 13, wherein said forming step includes the step of making a  
2 first solderable surface in one of said subassemblies and a second solderable surface in said  
3 other of said subassemblies, wherein said first solderable surface is in made in the  
4 configuration of a pin, and said second solderable surface is made in the configuration of a  
5 hole having a diameter larger than said pin.

1 23. The method of Claim 13, when said forming step includes the steps of forming a  
2 solderable pin on one of said subassemblies and a hole for receiving said pin on said other of  
3 said subassemblies.

1 24. The method of claim 13, wherein said moving step includes the step of aligning  
2 optical elements of said optical assembly with imaging elements of said image sensor  
3 assembly.

1 25. The method of claim 24, wherein said aligning step includes the steps of:

2 exposing said image sensor assembly to a predetermined test target; and  
3 observing indicia representing electrical signals generated by said image sensor.

*cont. A1*  
26. (Amended) An image sensor subassembly comprising:  
a substantially rigid member;  
an image sensor chip disposed on said substantially rigid member; and  
a solderable surface formed on said substantially rigid member, said solderable  
surface being of a configuration selected from the group consisting of a hole, pin, or threaded  
screw.

27. The image sensor subassembly of claim 26, wherein said solderable surface is  
made in an irregular configuration having an increased surface area per unit three dimensional  
space relative a smooth surface.

**SUB C27** 28. The image sensor subassembly of claim 26, wherein said solderable surface is  
made in the configuration of a hole.

29. The image sensor subassembly of claim 26, wherein said solderable surface is in  
the configuration of a pin.

30. The image sensor subassembly of claim 26, wherein said solderable surface is  
provided by a threaded screw.

31. The image sensor subassembly of claim 26, wherein said at least one solderable  
surfaces includes four solderable surfaces formed about a periphery of said image sensor.

**SUB C27** 32. (Amended) An optical subassembly comprising:  
a substantially rigid member;  
an optical element disposed on said substantially rigid member; and  
a solderable surface formed on said substantially rigid member, said solderable  
surface being of a configuration selected from the group consisting of a hole, pin, or threaded  
screw.

1 33. The optical subassembly of claim 32, wherein said solderable surface is made in  
2 an irregular configuration having an increased surface area per unit three dimensional space  
3 relative to that of a smooth surface.

1 **sub C47** 34. The optical subassembly of claim 32, wherein said solderable surface is made in  
2 the configuration of a hole.

1 35. The optical subassembly of claim 33, wherein said solderable surface is in the  
2 configuration of a pin.

1 36. The optical subassembly of claim 33 wherein said solderable surface is provided  
2 by a threaded screw.

1 37. The optical subassembly of claim 33, wherein said at least one solderable surfaces  
2 includes four solderable surfaces formed about a periphery of said image sensor.

**Please cancel claims 38-44 without prejudice or disclaimer.**

**Please add new claims 45-79 as follows:**

1 **sub C48** --45. The method of claim 1, wherein said method further comprises the step, after  
2 said moving step, of aligning said optical subassembly and image sensor subassembly using a  
3 video monitor which displays an output indicative of an output of said image sensor.

1 **sub C57** 46. A method for making an optical and image sensor assembly, said optical and  
2 image sensor assembly comprising an optical image sensor subassembly and an image sensor  
3 subassembly, said method comprising the steps of:  
4 aligning said optical subassembly and said image sensor subassembly relative to one  
5 another without substantially benching said optical subassembly and said image sensor  
6 subassembly against one another in either of the x direction or y direction; and  
7 when said optical subassembly and said image sensor assembly are properly aligned,  
8 securing said optical subassembly and said image sensor subassembly together.

1           47. The method of claim 46, further comprising the step of forming a solderable  
2 surface on at least one of said optical subassemblies or said image sensor subassemblies, and  
3 wherein said securing step includes the step of soldering said optical subassembly and said  
4 image sensor subassembly together using a solder material.

1           48. The method of claim 46, further comprising the step of forming a solderable  
2 surface on at least one of said optical subassemblies or said image sensor subassemblies,  
3 wherein said forming step includes the step of overmolding non-solderable material onto  
4 solderable material to form said solderable surface, and wherein said securing step includes  
5 the step of soldering said optical subassembly and said image sensor subassembly together  
6 using a solder material.

1           49. The method of claim 46, further comprising the step of forming a solderable  
2 surface on at least one of said optical or image sensor subassemblies, wherein said forming  
3 step includes the step of plating a solderable material onto a non-solderable material, and  
4 wherein said securing step includes the step of soldering said optical subassembly and said  
5 image sensor subassembly together using a solder material.

1           50. The method of claim 46, further comprising the step of forming a solderable  
2 material on at least one of said optical or image sensor subassemblies, wherein said forming  
3 step includes the step of insert molding solderable material in non-solderable material, and  
4 wherein said securing step includes the step of soldering said optical subassembly and said  
5 image sensor subassembly together using a solder material.

1           51. The method of claim 46, further comprising the step of forming a solderable  
2 surface on said optical subassembly, wherein said forming step includes the step of making a  
3 frame for said optical subassembly comprising essentially solderable material, and wherein  
4 said securing step includes the step of soldering said optical subassembly and said image  
5 sensor subassembly together using a solder material.

1           52. The method of claim 46, further comprising the step of forming a solderable

2 surface on at least one of said optical subassemblies or said image sensor subassemblies,  
3 wherein said forming step includes the step of making said solderable surface in an irregular  
4 configuration having an increased surface area per unit three dimensional space relative to  
5 that of a smooth surface, and wherein said securing step includes the step of soldering said  
6 optical subassembly and said image sensor subassembly together using a solder material.

1 53. The method of claim 52, wherein said at least one solderable surface is in the  
2 configuration of a pin.

1 54. The method of claim 52, when said at least one solderable surface is in the  
2 configuration of a threaded screw.

1 55. The method of claim 52, wherein said at least one solderable surface is in the  
2 configuration of a hole.

1 56. The method of claim 46, further comprising the step of forming a first solderable  
2 surface on one of said subassemblies and a second solderable surface in said other of said  
3 subassemblies, wherein said first solderable surface is in made in the configuration of a pin,  
4 and said second solderable surface is made in the configuration of a hole, wherein said pin  
5 has a diameter smaller than said hole to allow positional adjusting of said optical  
6 subassembly relative to said image sensor subassembly, and wherein said securing step  
7 includes the step of soldering said optical subassembly and said image sensor subassembly  
8 together using a solder material.

1 57. The method of Claim 46, further comprising the steps of forming a solderable pin  
2 on one of said subassemblies, and making a hole for receiving said pin on the remaining of  
3 said subassemblies, and wherein said securing step includes the step of soldering said optical  
4 subassembly and said image sensor subassembly together using a solder material.

1 58. The method of claim 46, further comprising the step of aligning said  
2 subassemblies using a video monitor which displays an output indicative of an output of said  
3 image sensor.

1           59. An imaging device comprising:  
2           an image sensor subassembly including an image sensor mounted on a printed circuit  
3 board;  
4           an optical subassembly, said optical subassembly including an optical element  
5 disposed on a substantially rigid member;  
6           at least one solderable surface formed on either of said printed circuit board or said  
7 optical subassembly defining at least one solder receiving interface between said printed  
8 circuit board and said optical subassembly; and  
9           solder material for bonding said subassemblies disposed at said at least one solder-  
10 receiving interface.

1           60. The device of claim 59, further including a housing encapsulating said device,  
2 said device partially defining a feed path.

1           61. The device of claim 59, further including a housing encapsulating said device,  
2 said housing including a handle.

1           62. The device of claim 59, wherein said at least one solderable surface is made in an  
2 irregular configuration having an increased surface area per unit three dimensional space  
3 relative to that of a smooth surface.

1           63. The device of claim 59, wherein said at least one solderable surface is made in the  
2 configuration of a hole.

1           64. The device of claim 59, wherein said at least one solderable surface is in the  
2 configuration of a pin.

1           65. The device of claim 59, wherein said at least one solderable surface is provided  
2 by a threaded screw.

1           66. An imaging device comprising:



an image sensor subassembly including an image sensor mounted on a printed circuit board;

an optical subassembly, said optical subassembly having a single receive optical axis and including an optical element disposed on a substantially rigid member;

at least one solderable surface formed on either of said image sensor subassembly or optical subassembly defining at least one solder receiving interface between said image sensor subassembly and said optical subassembly; and

solder material for bonding said subassemblies disposed at said at least one solder-receiving interface.

67. The device of claim 66, further comprises a housing encapsulating said device said housing partially defining a feed path for receiving documents.

68. The device of claim 66, further comprising a housing encapsulating said device said housing including a handle.

69. The device of claim 66, wherein said at least one solderable surface is made in an irregular configuration having an increased surface area per unit three dimensional space relative to that of a smooth surface.

70. The device of claim 66, wherein said at least one solderable surface is made in the configuration of a hole.

71. The device of claim 66, wherein said at least one solderable surface is in the configuration of a pin.

72. The device of claim 66, wherein said at least one solderable surface is provided by a threaded screw.

73. An optical reading device comprising:  
an optical and image sensor assembly including

3 an image sensor subassembly including an image sensor mounted on a substantially  
4 rigid planar member,  
5 an optical subassembly, said optical subassembly including an optical element  
6 disposed on a substantially rigid member,  
7 at least one solderable surface formed on either of said optical subassembly or said  
8 substantially rigid planar member defining at least one solder receiving interface between  
9 said substantially rigid planar member and said optical subassembly,  
10 solder material for bonding said subassemblies disposed at said at least one solder-  
11 receiving interface,  
12 a housing, said optical and image sensor assembly being disposed in said housing.

1 74. The device of claim 73, wherein said housing partially defines a feed path and  
2 wherein said device is a document reading device, for reading indicia from documents  
3 transported along said feed path.

1 75. The device of claim 73, wherein said housing includes a handle, and wherein said  
2 device is a hand held optical reader.

1 76. The device of claim 73, wherein said at least one solderable surface is made in an  
2 irregular configuration having an increased surface area per unit three dimensional space  
3 relative to that of a smooth surface.

1 77. The device of claim 73, wherein said at least one solderable surface is made in the  
2 configuration of a hole.

1 78. The device of claim 73, wherein said at least one solderable surface is in the  
2 configuration of a pin.

1 79. The device of claim 73, wherein said at least one solderable surface is provided  
2 by a threaded screw.--

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REMARKS